

What Is Claimed Is:

1. A vapor fuel generation and management system for an evaporative fuel vapor engine, comprising:

a fuel tank that defines a chamber adapted to store an evaporative liquid fuel, the fuel tank having a liquid fuel outlet and a fuel vapor outlet;

a carbon canister in communication with the fuel vapor outlet of the fuel tank;

a fuel vaporization unit that generates vapor fuel, the fuel vaporization unit including a stationary diffuser member, the fuel vaporization unit having a liquid fuel inlet in communication with the liquid fuel outlet of the fuel tank, a fuel vapor inlet in communication with the carbon canister, and a vapor fuel outlet in communication with an engine intake manifold; and

a purge valve that controls vapor fuel flow to the engine intake manifold.

2. The vapor fuel generation and management system of claim 1, wherein the fuel vaporization unit includes:

a housing having a wall defining a chamber, the housing chamber having a lower portion and an upper portion, the lower portion forming a liquid fuel space, the upper portion forming a vapor fuel space.

3. The vapor fuel generation and management system of claim 2, wherein

the liquid fuel inlet of the fuel vaporization unit includes a first port in the housing wall;

the fuel vapor inlet of the fuel vaporization unit includes a second port in the housing wall proximate the upper portion; and

the vapor fuel outlet of the fuel vaporization unit includes a third port in the housing wall proximate the upper portion.

4. The vapor fuel generation and management system of claim 3, wherein the fuel vaporization unit includes a liquid fuel outlet in communication with a liquid fuel inlet of the fuel tank.
5. The vapor fuel generation and management system of claim 4, wherein the liquid fuel outlet of the fuel vaporization unit includes a fourth port in the housing wall proximate the lower portion.
6. The vapor fuel generation and management system of claim 5, wherein the fuel vaporization unit includes a liquid fuel level sensor in the lower portion.
7. The vapor fuel generation and management system of claim 1, wherein the evaporative liquid fuel is gasoline.
8. A fuel vaporization unit of a vapor fuel generation and management system for an evaporative fuel vapor engine, comprising:
 - a housing having a wall defining a chamber, the housing chamber having a lower portion and an upper portion, the lower portion forming a liquid fuel space, the upper portion forming a vapor fuel space;
 - a liquid fuel inlet port in the housing wall;
 - a fuel vapor inlet port in the housing wall proximate the upper portion;
 - a vapor fuel outlet port in the housing wall proximate the upper portion; and
 - a stationary diffuser member at least partially disposed in the upper portion, the stationary diffuser member for dispersing flow of liquid fuel.
9. The fuel vaporization unit of claim 8, wherein the diffuser member includes an upper portion, a lower portion, and a surface extending from the upper portion to the lower portion, the surface facing the liquid fuel inlet port.

10. The fuel vaporization unit of claim 9, wherein the surface has a concave curvature from the upper portion to the lower portion.
11. The fuel vaporization unit of claim 10, wherein the liquid fuel inlet port and the diffuser member are disposed around a central axis.
12. The fuel vaporization unit of claim 9, wherein
a first portion of the surface proximate the upper portion of the diffuser member has a first area; and
a second portion of the surface proximate the lower portion of the diffuser member has a second area, the second area being more than the first area.
13. The fuel vaporization unit of claim 8, wherein the diffuser member is fixed to one of the housing and the liquid fuel inlet.
14. The fuel vaporization unit of claim 13, wherein the diffuser member comprises a nozzle.
15. The fuel vaporization unit of claim 8, further comprising:
a heater unit in thermal contact with the lower portion.
16. The fuel vaporization unit of claim 8, further comprising:
a liquid fuel outlet port in the housing wall proximate the lower portion.
17. The fuel vaporization unit of claim 8, further comprising:
a liquid fuel level sensor in the lower portion.
18. The fuel vaporization unit of claim 8, wherein the evaporative liquid fuel is gasoline.

19. A method of generating vapor fuel in a fuel vaporization unit for an evaporative fuel vapor engine, the fuel vaporization unit including a housing having a wall defining a chamber, the housing chamber having a lower portion and an upper portion, comprising:

flowing a liquid fuel into the chamber through a first inlet port in the housing wall;

flowing the liquid fuel by a stationary diffuser member;

flowing a fuel vapor into the chamber through a second inlet port in the housing wall proximate the upper portion;

forming vapor fuel in the upper portion of the chamber; and

flowing the vapor fuel out of the chamber through an outlet port in the housing wall proximate the upper portion.

20. The method of generating vapor fuel of claim 19, wherein the steps of flowing a fuel vapor into the chamber, and flowing the vapor fuel out of the chamber includes:

forming a vacuum at the outlet port with an evaporative fuel vapor engine manifold.

21. The method of generating vapor fuel of claim 19, comprising:

heating the liquid fuel bath with a heater unit.